Contaminated Ground Water Migration at Cleanup Sites

The EPA Superfund and Resource Conservation and Recovery Act (RCRA) Programs conduct a number of activities to address the nations most severely contaminated lands. The Programs investigate and collect data on potentially contaminated sites to determine whether they are contaminated and require cleanup. When a potentially hazardous waste site is reported to EPA, trained inspectors determine whether the site presents a hazard to human health and the environment. Sites that pose the greatest threat are placed on the National Priorities List (NPL) or RCRA Cleanup Baseline. For RCRA, sites are more commonly referred to as RCRA Corrective Action facilities.

One of the priorities for both the NPL and RCRA Cleanup Baseline sites is preventing the continued spread of contaminated ground water, often referred to as plumes of contaminated ground water. Protecting the ground water is especially important in areas where it is the primary source for drinking water and irrigation, or a potential source for future water supplies.

EPA and state officials determine that the migration of contaminated ground water is under control (i.e., not continuing to spread in concentrations above levels of concern) when ongoing monitoring shows that the contaminant plume is not expanding or negatively impacting surface waters (U.S. EPA, 1999, 2008, 2012a,b, 2014c). Further migration of contaminated ground water may be prevented by an action taken, such as installation of a pump and treat or subsurface barrier system, or by natural attenuation of the contaminants. A determination of whether migration has been prevented is based on monitoring data (usually from hundreds of analytical samples) collected from ground water wells within and surrounding the spatial extent of the ground water plume (U.S. EPA, 1999, 2008, 2012a,b, 2014c).

This indicator describes the percentage of NPL Indicator Baseline sites and RCRA Cleanup Baseline sites where government officials have determined that contaminated ground water is not continuing to spread in concentrations above levels of concern (e.g., that exceed the appropriate drinking water standards). This indicator covers NPL Indicator Baseline sites, and all 3,747 RCRA Cleanup Baseline facilities. The percentage of sites where ground water contamination continues to spread is also noted, as well as the number of sites where there are insufficient data to make a finding. The intention of the indicator is not to capture an action or administrative determination on the part of EPA, but to convey the underlying pressure on the environment and potential for human health effects resulting from contaminated ground water. Between 2002 and 2013, the number of NPL Indicator Baseline sites increased by 12 percent (from 1,494 to 1,672) and the number of RCRA facilities tracked by EPA as the Cleanup Baseline increased by 119 percent (from 1,714 to 3,747). Changes in the RCRA baseline are programmatic determinations and do not necessarily reflect the condition of the environment.

What the Data Show

Of the RCRA Cleanup Baseline sites, the percentage of sites where contaminated ground water has been determined to be under control increased from 32 percent (554 out of 1,714 sites) in fiscal year (FY) 2000 to 76 percent (2,840 out of 3,747 sites) in FY 2013 (Exhibit 1). This increase represents a combination of sites where mitigation has halted the spread of contaminated ground water and sites where data are sufficient to show that contaminated ground water migration was not continuing,

regardless of mitigation activities. The percentage of sites where officials have determined that ground water that is contaminated above levels of concern is spreading beyond the existing area of contamination decreased from 18 percent (306 out of 1,714 sites) in FY 2000 to 2.0 percent (75 out of 3,747 sites) in FY 2013. These sites, and the remaining 832 sites for which data are still insufficient for a determination at the end of FY 2013, tend to be very complex sites where the appropriate data have yet to be collected due to high costs or technical difficulties.

Ground water has not been an issue at all Superfund NPL sites. Of those NPL Indicator Baseline sites where ground water contamination is present, the percentage where contaminated ground water has been determined to be under control increased from 61 percent (772 of 1,275 sites) in FY 2002 to 72 percent (1,091 of 1,517sites) in FY 2013 (Exhibit 2). As of the end of FY 2013, ground water that is contaminated above levels of concern is spreading beyond the existing area of contamination at 12 percent (181) of these NPL sites, while the remaining 16 percent (245 sites) had insufficient data to confirm whether contaminated ground water is spreading above levels of concern. These percentages do not include NPL Indicator Baseline sites classified as non-ground water sites.

Limitations

- The NPL does not represent all of the contaminated or potentially contaminated sites listed in the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) database, which contains information on thousands of hazardous waste sites, potential hazardous waste sites, and remedial activities across the nation.
- The indicator results are presented for 1,714 RCRA Cleanup Baseline facilities tracked from 2000 to 2005, 1,968 facilities tracked from 2006 to 2008, and 3,747 facilities tracked since 2009 and not the entire group of approximately 6,000 hazardous waste management facilities that are potentially subject to RCRA Corrective Action requirements (e.g., initial assessments and, if needed, more thorough investigations and cleanups) (see http://www.epa.gov/epawaste/hazard/correctiveaction/index.htm). The extent to which people have been affected, or could be affected, by the contaminated ground water at NPL or RCRA Cleanup Baseline sites is not considered in this indicator, but is addressed in the Current Human Exposures Under Control at High-Priority Cleanup Sites indicator.
- The indicator does not address ground water contaminated at other types of sites, such as sites with leaking underground storage tanks and other sites being addressed solely by state cleanup programs.
- Concentrations of toxic and hazardous contaminants in ground water that must not be exceeded to designate a site as under control vary somewhat from state to state, though they fall within a range determined to be acceptable to EPA (U.S. EPA, 2008).
- This indicator is based on the certification by a responsible official that the criteria necessary to designate whether contaminated ground water is continuing to spread above levels of concern have been met (U.S. EPA, 1999, 2008). Trends in the number of sites where the spread of contaminated ground water has been shown to occur above levels of concern may be underestimated to the extent that certification lags behind the migration of contaminated ground water or certification is delayed due to insufficient or outdated information.

Data Sources

Data for this indicator were provided by EPAs Office of Solid Waste and Emergency Response

(OSWER) (U.S. EPA, 2014a,b). A list showing the current status of every RCRA baseline site is published online (U.S. EPA, 2014d). A summary of the status of Superfund NPL sites is available online; information on the current status of any individual NPL site can be queried using EPAs CERCLIS database (U.S. EPA, 2012b) (http://cumulis.epa.gov/supercpad/cursites/srchsites.cfm). For RCRA sites, partial data for previous years can be accessed at http://www.epa.gov/epawaste/hazard/correctiveaction/baseline.htm; other previous-year data must be requested from OSWER.

References

U.S. EPA (United States Environmental Protection Agency). 2014a. Data for RCRA corrective action sites. Personal communication, Steve Kohm, EPA Office of Resource Conservation and Recovery, within the Office of Solid Waste and Emergency Response. August 7, 2014.

U.S. EPA. 2014b. Data for Superfund NPL sites. Personal communication, Richard Norris, EPA Office of Solid Waste and Emergency Response. July 28, 2014.

U.S. EPA. 2014c. Superfund environmental indicators: Site-wide human exposure environmental indicator. http://www.epa.gov/superfund/accomp/ei/ei.htm. Accessed August 18, 2014.

U.S. EPA. 2014d. Facility information. http://www.epa.gov/epawaste/hazard/correctiveaction/facility/index.htm#2020. Last updated May 23, 2014.

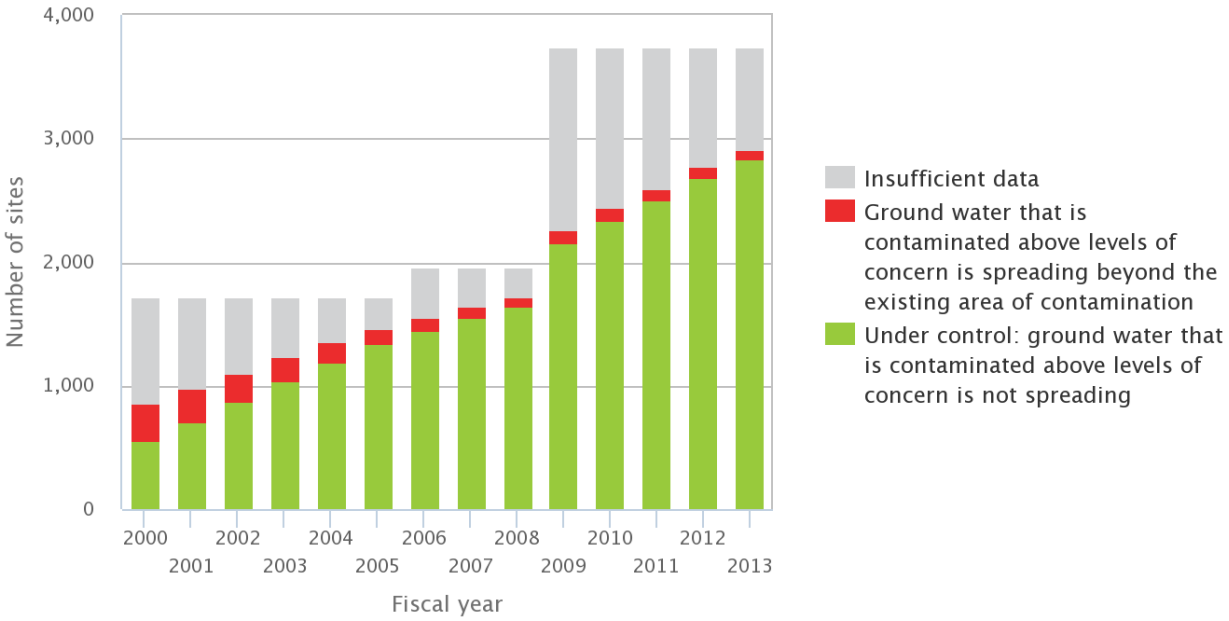
U.S. EPA. 2012a. Corrective action: Environmental indicators. http://www.epa.gov/epawaste/hazard/correctiveaction/eis/index.htm. Last updated July 25, 2012.

U.S. EPA. 2012b. Superfund site information. http://www.epa.gov/superfund/sites/cursites/index.htm. Last updated January 3, 2012.

U.S. EPA. 2008. Superfund environmental indicators guidance: Human exposure revisions. http://www.epa.gov/superfund/accomp/ei/pdfs/final_ei_guidance_march_2008.pdf (PDF) (80 pp, 1.6MB).

U.S. EPA. 1999. Documentation of environmental indicator determination, interim final 2/5/99. http://www.epa.gov/epawaste/hazard/correctiveaction/eis/ei_guida.pdf (PDF) (17 pp, 47K).

Exhibit 1. Status of migration of contaminated ground water under control at RCRA Cleanup Baseline sites in the U.S., fiscal years 2000–2013



The number of sites included in the RCRA cleanup baseline changed from 1,494 to 1,968 to 3,747 in 2006 and 2009, respectively. The 2009 baseline of 3,747 sites is referred to as the RCRA Corrective Action 2020 Universe.

"Insufficient data" includes sites officially classified as "insufficient data" or "no status."

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: U.S. EPA, 2014a

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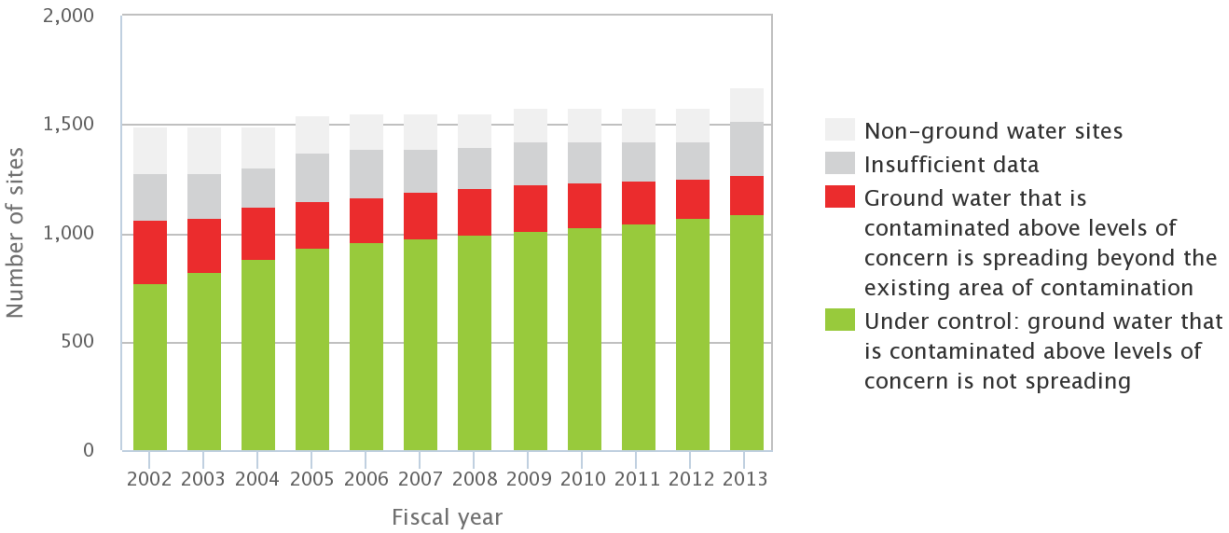
Exhibit 2. Status of migration of contaminated ground water under control at Superfund National Priorities List Indicator Baseline sites in the U.S., fiscal years 2002–2013



The number of sites included in the NPL Indicator Baseline changed from 1,494 to 1,544 to 1,554 to 1,583 to 1,672 in 2005, 2006, 2009, and 2013, respectively.

"Insufficient data" includes sites officially classified as "insufficient data" or "no status."

For calculating the percentage of sites in each category, the total does not include "non-ground water" sites.

Information on the statistical significance of the trends in this exhibit is not presented here. For more information about uncertainty, variability, and statistical analysis, view the technical documentation for this indicator.

Data source: U.S. EPA, 2014b

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